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Remarks

Thorough examination by the Examiner is noted and appreciated.

The claims have been amended to overcome Examiners 112 rejections and to define over Examiners interpretation of a bubble shaped vapor-liquid gas interface.

Support for the amendment is found in the Figures, including Figure 3, item 42 (liquid primer) and in the Specification.

No new matter has been added.

Claim Rejections under 35 USC 112

Claim 20 has been amended to overcome Examiners rejection.

Claim Rejections under 35 USC 102/103(a)

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1. Claims 9-11, 17, 18, 22, and 23 stand rejected under 35 USC 103(a) as being as being unpatentable over Fukada (5,733,375) in view of Yamaguchi (5,803,938) or Martin (3,608,280).

Fukada discloses an HDMS vaporizer having several embodiments; several embodiments include a **gas bubbler** disposed at a bottom portion of a liquid holding tank submerged in the liquid (e.g., Figures 1, 3, 5, item 4). In addition, Fukada discloses an embodiment without a gas bubbler where a **single gas stream** is directed onto a liquid surface and having a configuration similar to that disclosed by Applicants as prior art (see Fukada Figure 6, Applicants Figure 1).

Thus, Fukada fails to disclose several elements of Applicants disclosed and claimed invention **including Applicants claimed nozzle assembly** in claim 9 as well as Applicants claimed method in claim 17 including **"directing an inert gas comprising a plurality of gas streams** onto said exposed surface to form a vapor above said liquid vapor interface". Rather, the apparatus of Fukada (**single gas stream**) **presents the very problem**, that Applicants disclosed and claimed invention **overcomes (reduced primer droplet formation)** (see col 8, lines 18-20, lines 27-30;

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Figure 6).

Martin discloses a series of diffusion plates for bubbling air through (submerged in) liquid in what appears to be an air cleaning system (see e.g., Figure 2).

Yamaguchi and Martin disclose gas bubblers for forming gas bubbles within a liquid, similar to embodiments disclosed by Fukada (e.g., Figures 1, 3, 5, item 4). Yamaguchi discloses a bubbling tube submerged in a liquid, and in one embodiment, a diffusion plate over the bubbling tube (Figures 18 and 19, col 27, line 44 to col 28, line 23).

The gas bubblers of Fukada, Yamaguchi, and Martin operate by a different principal of operation than Applicants disclosed and claimed invention. The modification of Fukada, Yamaguchi, or Martin in an effort to achieve Applicants disclosed and claimed invention would render the apparatus and methods of Fukada, Yamaguchi, or Martin unsuitable for their intended operation.

Even assuming *arguendo* a proper motivation for combining Fukada with Yamaguchi or Martin, such combination does not

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produce Applicants disclosed and claimed invention.

"Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Applicants note that the cited references, singly or in combination, nowhere recognize or provide a solution to the problem that Applicants have recognized and solved by their disclosed and claimed invention and that the single stream nozzle of Fukada presents the very problem that Applicants disclosed and claimed invention overcomes:

"A primer tank for generating a primer vapor for treating a substrate **with reduced primer droplet formation**".

Examiner argues that Applicants claims do not **exclude** gas bubblers and that Applicants claimed liquid vapor interface reads on a liquid vapor interface of a bubble submerged in the liquid.

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Applicants respectfully note that while Applicants do not agree with Examiners overly-broad interpretation of Applicants 'exposed surface' and 'liquid vapor interface', the claims have been amended to define over Examiners overly-broad interpretation of Applicants claims to further prosecution on the merits.

2. Claim 19 stands rejected under 35 USC 103(a) as being as being unpatentable over Fukada, in view of Yamaguchi or Martin, above and further in view of Applicants discussion of the prior art.

Applicants reiterate the comments made above with respect to Fukada, Yamaguchi, and Martin.

Applicants describe a subatmospheric pressure (50 kPa) for a prior art vaporizer and the problems associated therewith (see page 7, beginning at line 16), which Applicants disclosed and claimed invention overcomes:

One of the drawbacks associated with the conventional primer application system 8 is that the nitrogen inlet pipe 16 directs the single stream of nitrogen gas 18 at a pressure of typically about 50 KPa against a relatively small area of the liquid HMDS 12. This considerable impact energy between the gas 18 and the liquid HMDS 12 generates HMDS droplets 32 (FIG. 2) which are drawn with the HMDS vapor 22 into the oven 24, where the HMDS droplets 32 are

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deposited onto the surface of the substrate 26 with the HMDS primer layer 23.

Even assuming *arguendo* a proper motivation for combining Applicants prior art system that works by a different principle of operation that the gas bubblers of Fukada, Yamaguchi, and Martin, such combination does not help Examiner in producing Applicants disclosed and claimed invention.

"Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

3. Claims 9-11, 17-18, 22 and 23 stand rejected as being anticipated by Fukada, above, under 35 USC 102(b), or in the alternative, under 35 USC 103(a) as being unpatentable over Fukada, above.

Applicants reiterate the comments made above with respect to Fukada.

Applicants note that Fukada nowhere recognizes or provides a solution to the problem that Applicants have recognized and

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solved by their disclosed and claimed invention and that the single stream nozzle of Fukada presents the very problem that Applicants disclosed and claimed invention overcomes:

"A primer tank for generating a primer vapor for treating a substrate **with reduced primer droplet formation**".

Nevertheless, Fukada, as noted above, fails to disclose several elements of Applicants disclosed and claimed invention and therefore fails to make out a *prima facie* case of obviousness.

"Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

4. Claim 19 stands rejected under 35 USC 103(a) as being as being unpatentable over Fukada, in view of Applicants discussion of the prior art.

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Applicants reiterate the comments made above with respect to Fukada and Applicants discussion of the prior art.

5. Claims 1-3, 5, 9-11, 13, 24 and 25 stand rejected under 35 USC 102(a) as being anticipated by or, in the alternative, under 35 USC 103(a) as being unpatentable over Tomkins (6,561,498).

Tomkins, discloses a bubbler apparatus for vapor generation where a plurality of small generator tubes are submerged below an exposed liquid surface formed by a contained liquid in a tank body for forming bubbles (see Abstract, Figure 3).

Examiner is clearly mistaken in asserting that that Tomkins discloses a nozzle plate (item 12, Figure 3) as Applicants claim:

"a nozzle assembly comprising a nozzle plate, said nozzle plate comprising a plurality of openings, said plurality of openings disposed above said exposed surface and arranged for directing a plurality of gas streams onto said exposed surface to form said primer vapor in a vapor collection space above said liquid vapor interface."

Rather, Tomkins discloses a carrier gas distribution plenum

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from which a plurality of **small diameter generator tubes** extend that are **submerged below the exposed surface** of the liquid for producing **bubbles within the liquid**.

Applicants reiterate, the comments made above with respect to the gas bubblers of Fukada, Yamaguchi, and Martin i.e., gas bubblers operate by a **different principal of operation** than Applicants disclosed **and claimed** invention and the modification of the gas bubbler of Tomkins in an effort to achieve Applicants disclosed and claimed invention would be made unsuitable for its intended operation.

Thus Tomkins is clearly insufficient to make out either a *prima facie* case of anticipation or obviousness.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

"Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The

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teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

6. Claims 17, 18, and 20-23 stand rejected under 35 USC 103(a) as being unpatentable over Tomkins, above, in view of Fukuda, above.

Applicants reiterate the comments made above with respect to Tomkins and Fukuda.

Applicants again note that the fact that Fukuda teaches that providing a nozzle with a single gas stream (similar to that of Applicants discussion in the prior art and problems presented thereby) does not, in combination with the **submerged gas bubbler of Tomkins** further help Examiner in producing Applicants disclosed and claimed invention.

"Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior

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art, and not based on applicant's disclosure." *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

7. Claim 19 stands rejected under 35 USC 102(b) as being as being unpatentable over Tomkins in view of Fukuda, above, in further view of Applicants discussion of the prior art.

Applicants reiterate the comments made above with respect to Fukuda and Tomkins and Applicants discussion of the prior art including the problems presented (droplet formation) by the single gas stream nozzle of Fukuda.

8. Claims 1, 3, 5, 17, 18, 20 and 22-24 stand rejected under 35 USC 103(a) as being unpatentable over Fukuda (5,733,375) in view of Coombs (1,336,070) or Brunner (545,048) and taken further in view of Tomkins, above.

Applicants reiterate the comments made above with respect to Fukuda and Tomkins.

Coombs teaches the non-analogous art of a carburetor. In the apparatus of Coombs, air is delivered into or through liquid fuel to effect a turbulent churning action and effect a complete

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and thorough intermingling of the air and liquid fuel (see col 1, lines 18-24; col 2, lines 20-31). The apparatus of Coombs **includes a cone** with a plurality of openings to allow adjustment of **full or partial submersion of the cone into the fuel.**

The apparatus of Coombs in combination with Fukuda could not produce the claimed structure nor accomplish the claimed function (operation) of Applicants apparatus and further, would destroy the purpose and benefit of Applicants disclosed and claimed purpose of reducing primer vapor droplet formation.

Thus, even assuming *arguendo*, analogous art, and a proper motivation for combining the teachings of Coombs and with Fukada, such combination does not produce Applicants disclosed and claimed invention.

On the other hand, Brunner also discloses non-analogous art of carburetors and does not recognize the problem that Applicants have solved by their disclosed and claimed invention "A method of generating a primer vapor from a liquid primer for treating a substrate to reduce primer vapor droplet formation".

Brunner teaches an apparatus where **one or more downwardly**

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projecting pipes terminate a short distance above the surface of a liquid hydrocarbon to cause air currents to impinge directly on the surface (see col 1, lines 12-20).

Even assuming *arguendo*, *analogous art*, and a proper motivation for combining the teachings of Brunner with Fukada, such combination does not produce Applicants disclosed and claimed invention.

Moreover, Brunner's **one or more** downward projecting pipes (similar to Fukuda) creates the very problem that Applicants have disclosed as a problem in the prior art (droplet formation) and which their disclosed and claimed invention overcomes.

Applicants have discussed the teachings of Tomkins, above.

Even assuming *arguendo*, a proper motivation for combining the disparate teachings of the single gas stream onto an exposed surface of Fukada with the fully or partially submerged carburetors of Coombs or Brunner, the **submerged gas distribution plenum** of Tomkins for producing **bubbles within the liquid**, such combination does not further help Examiner in producing Applicants disclosed and claimed invention.

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"Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." *In re Vaack*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

9. Claim 19 stands rejected under 35 USC 103(a) as being unpatentable over Fukuda (5,733,375) in view of Coombs (1,336,070) and Brunner (545,048) and taken further in view of Tomkins, above, and further in view of Applicants discussion in the prior art.

Applicants reiterate the comments made above with respect to Fukuda, Coombs, Brunner, Tomkins, and Applicants discussion of the prior art including the problems presented (droplet formation) by the single gas stream nozzle of Fukuda and which Applicants disclosed and claimed invention overcomes.

10. Claims 2, 9-11, 13, and 25 stand rejected under 35 USC 103(a) as being unpatentable over Fukuda (5,733,375) in view of Coombs (1,336,070) and Brunner (545,048) and taken further in

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view of Tomkins, above.

Applicants respectfully note that this is the same art applied in rejection under 8, above, and that claim 2 is a dependent claim.

Applicants reiterate the comments made above with respect to Fukuda, Coombs, Brunner, and Tomkins.

11. Claims 1-3, 5, 9-11, 13, 24, and 25 stand rejected under 35 USC 103(a) as being unpatentable over Coombs (1,336,070) in view of Tomkins, above.

Applicants reiterate the comments made above with respect to Coombs and Tomkins,

Applicants reiterate that the non-analogous art of Coombs disclosing a carburetor **including a cone** with a plurality of openings to allow **full or partial submersion of the cone into the fuel** to effect a turbulent churning action (i.e. droplet creation) would destroy the purpose and benefit of Applicants disclosed and claimed invention.

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On the other hand, the submerged plenum of Tomkins to create bubbles works by a different principle of operation than Applicants disclosed and claimed invention.

Nevertheless, even assuming *arguendo* that Coombs is analogous art and a proper motivation for combination exists, such combination does not (and could not) produce Applicants disclosed and claimed invention.

"Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Conclusion

The multiplicity of cited references, singly or in combination, fail to produce Applicants disclosed and claimed invention and therefore fail to make out a *prima facie* case of

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obviousness.

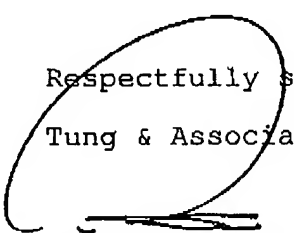
The Claims have been amended to further clarify Applicants' disclosed and claimed invention. A favorable reconsideration of Applicants' claims is respectfully requested.

Based on the foregoing, Applicants respectfully submit that the Claims are now in condition for allowance. Such favorable action by the Examiner at an early date is respectfully solicited.

In the event that the present invention as claimed is not in condition for allowance for any reason, the Examiner is respectfully invited to call the Applicants' representative at his Bloomfield Hills, Michigan office at (248) 540-4040 such that necessary action may be taken to place the application in a condition for allowance.

Respectfully submitted,

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